

# Use YALE® Closures for ESD Testing



Partner Reported Opportunities (PROs)  
for Reducing Methane Emissions

## PRO Fact Sheet No. 605

### Applicable sector(s):

☐ Production ☒ Processing ☒ Transmission and Distribution

**Partners reporting this PRO:** Northern Natural Gas

**Other related PROs:** Redesign Blowdown Systems and Alter ESD Practices, Move Fire Gates to Reduce Venting at Compressor Station

Compressors/Engines ☐  
Dehydrators ☐  
Pipelines ☐  
Pneumatics/Controls ☐  
Tanks ☐  
Valves ☒  
Wells ☐  
Other ☐

### Technology/Practice Overview

#### Description

Department of Transportation (DOT) regulations require that emergency shut down (ESD) systems at gas compression stations to be fully tested on an annual basis. One common practice is to activate the entire system, which discharges very large volumes of gas to the atmosphere. A DOT acceptable alternative is to test each individual dump valve with the discharge stack blind flanged. This greatly reduces gas emissions, but has higher labor costs associated with installing and removing a blind flange on each ESD valve.

One partner reports using YALE® closures to make the individual ESD valve testing alternative cost effective, saving the gas emissions from a total station dump. The YALE® closure is a screwed-on pipe cap with a built in needle valve that bleeds the gas pressure off the ESD valve stack for safely removing the YALE® device.

#### Operating Requirements

The ESD valve must have a vent stack with a threaded end to receive the YALE® closure cap.

#### Applicability

This technology can be used on all ESD valves.

### Methane Savings: 1,800 Mcf per year

#### Costs

Capital Costs (including installation)

☐ <\$1,000 ☒ \$1,000 – \$10,000 ☐ >\$10,000

Operating and Maintenance Costs (annual)

☐ <\$100 ☒ \$100-\$1,000 ☐ >\$1,000

#### Payback (Years)

☐ 0–1 ☒ 1–3 ☐ 3–10 ☐ >10

#### Benefits

Reducing methane emissions was the primary benefit of the project.

### Methane Emissions Reductions

Methane emissions savings may be estimated by subtracting the volume of gas contained in the blocked in ESD stacks at line pressure from the ESD valve relief rate when cycled open and closed. For an 8-inch ESD valve with a 3-foot stack, the open relief rate is about 400 Mcf per minute on a 500-psig system, and the volume of gas in the closed stack is about 40 scf. Retrofitting ten ESD valves at a typical compression station would save about 1,800 Mcf per year.

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## **Economic Analysis**

### **Basis for Costs and Savings**

Methane emissions savings of 1,800 Mcf per year are based on typical compression station with 8 compressors, and having 10 eight-inch ESD valves. The test is assumed to be conducted at a time when the station pressure is at 500 psig. Each valve is tested once per year using YALE® closures as an alternative to an annual total station dump, cycling all ten valves open and closed in one minute.

### **Discussion**

The primary considerations for the reporting partner's installation of YALE® closures was to save operating labor required to install blind flanges on each ESD valve stack as an alternative to a total station dump. However, for operators currently performing annual total station dump tests, the gas savings alone would justify the installation costs of modifying the ESD valve stack to receive YALE® closures and the cost of the YALE® closure devices. YALE® closure devices range in cost from \$785 to \$1,600 for 8-inch to 12-inch sizes, not installed.